

Claims

- [c1] 1. A network attached storage system that provides the ability to hot swap a data storage device comprising:
- an enclosure capable of holding at least one data storage device;
 - an interface for connecting the system to: (a) a network infrastructure that facilitates communications between the system and another computer related device; and (b) a supply of power;
 - a first electrical interface, located within said enclosure, for providing power and data to a data storage device;
 - a mounting bay for a data storage device, said mounting bay comprises: (a) a carriage capable of holding a data storage device and comprising a second electrical interface that is capable of engaging said first electrical interface;
 - (b) a receiving structure capable of holding said carriage; and (c) a latch that allows said carriage to be operatively attached to said enclosure and detached from said enclosure;
 - a detector capable of: (a) sensing movement of a physical structure that is indicative of the possible disengagement of said second electrical interface of said carriage from said first electrical interface and (b) producing a signal indicative thereof; and
 - processing electronics for receiving said signal output by said detector and, after receiving said signal, causing action to be taken before said second electrical interface is disengaged from said first electrical interface to prevent the loss or corruption of any data being transferred to or from any data storage device associated with said carriage.
- [c2] 2. A network attached storage system, as claimed in claim 1, wherein: said enclosure is capable of holding at least one block data storage device.
- [c3] 3. A network attached storage system, as claimed in claim 1, wherein: said enclosure is capable of holding at least one disk drive.
- [c4] 4. A network attached storage system, as claimed in claim 1, wherein: said enclosure is capable of holding an IDE disk drive.

- [c5] 5. A network attached storage system, as claimed in claim 1, wherein:
said carriage comprises an exterior covering for a data storage device.
- [c6] 6. A network attached storage system, as claimed in claim 1, wherein:
said receiving structure comprises a rail; and
said carriage comprises a slot for slidably engaging said rail.
- [c7] 7. A network attached storage system, as claimed in claim 6, wherein:
when said carriage is engaged to said rail and said carriage is holding a data
storage device, both said carriage and said rail are substantially located
between the data storage device and one of a top side and a bottom side of
said enclosure.
- [c8] 8. A network attached storage system, as claimed in claim 1, wherein:
said latch comprises a latch actuator and a latch pin;
said latch actuator is operatively attached to one of said carriage and said
enclosure; and
said latch pin is operatively attached to the other one of said carriage and
said enclosure.
- [c9] 9. A network attached storage system, as claimed in claim 8, wherein:
said detector comprises a mechanical switch that mechanically senses
movement of said latch actuator;
wherein said signal output by said mechanical switch has a first level when
said latch actuator is located at a first position and a second level when said
latch actuator moves to a second location that is indicative of the possible
disengagement.
- [c10] 10. A network attached storage system, as claimed in claim 8, wherein:
said detector comprises an electro-optical switch that optically senses
movement of said latch actuator;
wherein said signal output by said electro-optical switch has a first level
when said latch actuator is located at a first position and a second level when
said latch actuator moves to a second location that is indicative of the

possible disengagement.

- [c11] 11. A network attached storage system, as claimed in claim 8, wherein:
said detector comprises a mechanical switch that mechanically senses
relative movement between said carriage and said enclosure;
wherein said signal output by said mechanical switch has a first level when
said latch actuator is located at a first position and a second level when said
latch actuator moves to a second location that is indicative of the possible
disengagement.
- [c12] 12. A network attached storage system, as claimed in claim 8, wherein:
said detector comprises an electro-optical switch that optically senses
relative movement between said carriage and said enclosure;
wherein said signal output by said electro-optical switch has a first level
when said latch actuator is located at a first position and a second level when
said latch actuator moves to a second location that is indicative of the
possible disengagement.
- [c13] 13. A network attached storage system, as claimed in claim 1, wherein:
said processing electronics comprises a switch for grounding all data lines
associated with said first electrical interface.
- [c14] 14. A network attached storage system, as claimed in claim 1, wherein:
said processing electronics comprises an operating system.
- [c15] 15. A network attached storage system, as claimed in claim 1, wherein:
said processing electronics is located between an operating system and said
first electrical interface.
- [c16] 16. A network attached storage system that provides the ability to hot swap
a data storage device comprising:
an enclosure capable of holding at least one data storage device;
an interface for connecting the system to: (a) a network infrastructure that
facilitates communications between the system and another computer related
device; and (b) a supply of power;

a first electrical interface, located within said enclosure, for providing power and data to a data storage device;

a mounting bay for a data storage device, said mounting bay comprises: (a) a carriage capable of holding a data storage device and comprises a second electrical interface that is capable of engaging said first electrical interface and a third electrical interface that is capable of engaging a fourth electrical interface associated with a data storage device; (b) a receiving structure capable of holding said carriage; and (c) a latch that allows said carriage to be operatively attached to said enclosure and detached from said enclosure; a detector capable of: (a) sensing movement of a physical structure that is indicative of the possible disengagement of said second electrical interface of said carriage from said first electrical interface and (b) producing a signal indicative thereof;

a pathway for conveying said signal, said pathway being separate from said first electrical interface; and

processing electronics for receiving said signal output by said detector and, after receiving said signal, causing action to be taken before said second electrical interface is disengaged from said first electrical interface to prevent the loss or corruption of any data being transferred to or from any data storage device associated with said carriage.

[c17] 17. A network attached storage system, as claimed in claim 16, wherein: said carriage includes a card for holding said second electrical interface and said third electrical interface.

[c18] 18. A method for providing the ability to "hot swap" a data storage device in a network attached storage device in a manner that substantially reduces the possibility of the loss or corruption of data being transferred between the data storage device and the exterior environment comprising:
sensing movement of a physical structure that is indicative of the possible separation of a first electrical interface from a second electrical interface that each provide electrical paths for data signals and power to a data storage device;

wherein said second electrical interface is located between said first electrical interface and a network interface of the network attached storage device;

producing an electrical signal indicative of sensed movement; and
responding to said electrical signal by taking action before such possible separation so as to prevent the loss or corruption of data being transferred to/from the data storage device.

[c19] 19. A method, as claimed in claim 18, wherein:
said step of sensing comprises using an optical sensor.

[c20] 20. A method, as claimed in claim 18, wherein:
said step of sensing comprises using a mechanical sensor.

[c21] 21. A method, as claimed in claim 1, wherein:
said step of responding includes grounding all data lines associated with said second electrical interface.

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